

SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Solve the equation $x + 4y - z = -5$,
 $x + y - 6z = -12$, $3x - y - z = 4$ by the Gaussian
Elimination method.

17. Using the following values to find the value
of y , when $x = 0.5$ by Newton Forward method

x	0	1	2	3
y	1	0	1	10

18. Explain in detail of all executable statements with
example.

19. Write the program for parabola and their slope
using FORTRAN.

20. Fit a parabola, by the method of least squares, to
the following data; also estimate y at $x = 6$.

x	1	2	3	4	5
y	5	12	26	60	97

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B.Sc. DEGREE EXAMINATION, JULY 2023.

Sixth Semester

Physics

NUMERICAL METHODS AND COMPUTATIONAL
PHYSICS

(From 2017–18 onwards)

Time : Three hours

Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL the questions.

All questions carry equal marks.

1. State the principle used in Gauss Jordan method.
2. Write down the condition for the convergence.
3. Define interpolation and extrapolation.
4. When will you use Newton's forward and backward interpolation?
5. What is the difference between If Then and Do While Statements?
6. Write any five built-in functions in FORTRAN.

7. What is the First statement in FORTRAN code?
8. Give an example of INPUT/OUTPUT statement in FORTRAN.
9. Write down the formula for forward interpolation method.
10. State the principle of least squares.

SECTION B — (5 × 5 = 25 marks)

Answer ALL the questions, choosing either (a) or (b).

All questions carry equal marks.

11. (a) Find the positive $x^3 - 6x + 4$ root correct to three decimal places using Newton Raphson method.

Or

- (b) Solve the equation $3x + y + 2z = 3$, $2x - 3y - z = -3$, $x + 2y + z = 4$ by Gauss Jordan Method.

12. (a) Find the largest eigen value and eigen vector of the matrix by power method. $A = \begin{bmatrix} 1 & 4 \\ 3 & 2 \end{bmatrix}$

Or

- (b) Fit the straight line to the data given below

x	0	1	2	3	4
y	0	1.8	3.3	4.5	6.3

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13. (a) Explain in detail about the Languages and packages.

Or

- (b) Bring out the advantages of Built in Functions in FORTRAN.

14. (a) Write down the program for sum of series using FORTRAN.

Or

- (b) Using the Algorithm, Write the Product of 'n' series program in FORTRAN.

15. (a) Using Lagrange's formula of interpolation, find $y(10)$ given

x	5	6	9	11
y	12	13	14	16

Or

- (b) Derive Newton's Backward Interpolation formula.

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